FLIGHT SOFTWARE MAINTENANCE

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Responsibilities of Flight Software Systems Branch (FSSB) (GSFC Code 512)

- Prelaunch IV&V testing of EOS AM-1 spacecraft bus FSW
- Postlaunch maintenance of EOS-AM FSW after orbital verification (L+90 days) [Code 512 to assume responsibility per memorandum of understanding (MOU) with project]
- Postlaunch maintenance of SSIM, including adding capabilities and improving performance

FSSB Experience

- Developed FSW and performed Independent Verification and Validation (IV&V) testing for X-ray Timing Explorer (XTE)
- Developed FSW and performed testing and maintenance for Extreme Ultraviolet Explorer (EUVE) and Gamma Ray Observatory (GRO)
- Will perform IV&V testing and postlaunch FSW maintenance for EOS PM-1

FSSB Prelaunch Activities

- Work out details of specific maintenance activities as part of validation testing
- Participate in FSW development
- Participate in and provide FSW support for spacecraft I&T, end-to-end tests, launch simulations, launch, and early orbital verification

FOT/FSW Interfaces

- FOT personnel
  - Supported FSW IV&V test scenario walkthroughs
  - Will support FSW validation tests [up to 0.5 full-time equivalent (FTE) starting January 1997]
- FSW maintenance personnel
  - Will participate in FOT training
  - Will inform FOT of FSW discoveries

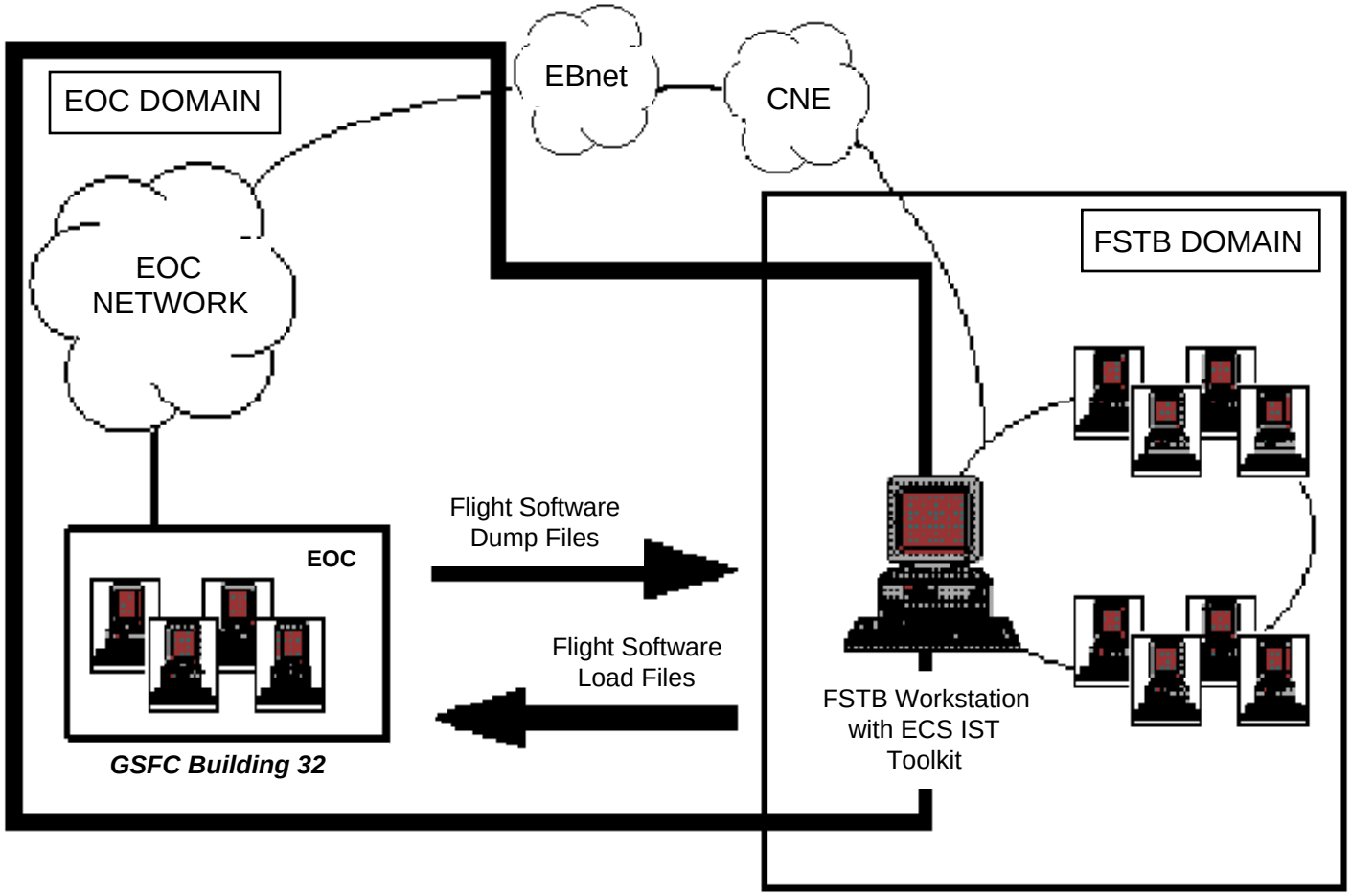
Flight Software Testbed

- Used for FSW development and testing
- Consists of actual flight processors (SCC and CTIU), real-time spacecraft simulator, and user interface
- Three flight software testbeds (FSTBs)
  - SDF FSTB
  - SSIM
  - IV&V FSTB
    - » Will be delivered to Code 512 in December 1996
    - » Is being built by AM Project with key components supplied by Lockheed Martin Valley Forge (LMVF)

EOC Interface

- IST serves as application interface for transferring
  - FSW loads from FSTB to EOC
  - FSW dumps from EOC to FSTB
- Connectivity is achieved through EBnet and the Center Network Environment (CNE)

EOC/FSTB Interface Overview



EOC Interface

- FSW loads
  - FSW maintenance loads will consist of FSW patches and certain table loads (e.g., TMON, RTCSs)
  - Colorado System Test and Operations Language (CSTOL) procedure will contain steps for loading and checking patches
    - » Patch procedures will first be written and tested on FSTB
    - » CSTOL procedure will then be translated to ECL procedure (using instrument support toolkit) and tested on SSIM
  - Test will be devised on FSTB and SSIM to determine whether patch that was uplinked performs as expected
  - For every patch, a “back-out” patch shall be developed and tested on both FSTB and SSIM
  - FSW maintenance personnel will oversee loading of all patches to spacecraft in the EOC
- FSW dumps
  - FSW maintenance team will need regular updates of FSW image
  - FSW will work out mechanism with FOT to provide regular updates